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ABSTRACT

This report discusses the findings of a study that examined the reflections of identified "expert" special educators (n=20) working in a variety of instructional settings with diverse student populations. Special education supervisors were asked to nominate teachers who: (1) had at least five years of teaching experience, (2) were recognized among their peers, parents or the community as being effective teachers, (3) instructed students that generally made excellent progress in achieving their individualized education plan objectives, and (4) were viewed as superior special education teachers. Teachers viewed videotapes of themselves teaching and recalled thoughts or feelings that occurring during the instruction. Results indicate that teachers made frequent use of "instructional diagnosis," in which teachers used extensive content knowledge and the particular knowledge of the student to arrive at a diagnosis. Immediately following the diagnosis, they applied a modification to remedy the learning difficulty that the student was encountering. This procedure was repeated numerous times over the course of the instructional period, with a diagnosis of one student often being made several times in the space of five or ten minutes. This instructional diagnosis did not seem to rely on the category assigned to a student; instead, teachers closely observed the progress of the student, basing their observation on the student's progress, together with their past knowledge of the student. (Contains 35 references.) (CR)

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Listening to Voices of Experience in Special Education

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Listening to Voices of Experience in Special Education

Providing a free, appropriate public education for all students with a disability has been a national issue for over 20 years. The availability of qualified educators and related service personnel has been identified as a necessary prerequisite to providing this "appropriate" education (IDEA; PL 101-476, Turnbull, 1993). Unfortunately, there is a lack of clarity as to what it means to be a "qualified" special educator. For example, as only a small proportion of special education teachers remain in the field for longer than four or five years (Brownell & Smith, 1992), many students with disabilities recieve services from teachers who are certified but have had limited experience in the classroom. In addition, due to the limited availability of special education teachers, the number of alternative teacher certification programs with few prerequisite or training requirements has increased in recent years (Buck, Polloway & Robb, 1995). There are concerns that many teachers participating in these programs may be inadequately prepared to meet the instructional needs of their students (Buck et al., 1995; Sindelar & Marks, 1993). Furthermore, even though a number of competencies have been identified that are purportedly needed by special education teachers (e.g., Council for Exceptional Children, 1995; Graves, Landers, Lokerson, Luchow, & Horvath, 1993), these competencies have limited empirical support and do not examine the effects of instructional contexts on effective instruction (Blanton, 1992; Goldenberg and Gallimore, 1991).

Several changes in the nature of special education have particularly influenced the role that these teachers now play in the educational system. The normalization and mainstreaming movements over the last twenty-five years called for the inclusion of special education students in regular education classrooms (Reynolds, Wang, & Walberg, 1987; Stainback & Stainback, 1992). As a result, special and regular education teachers are instructing classrooms of students with wide ranges of academic and behavioral needs in a variety of instructional arrangements (Fuchs & Fuchs, 1994). Special education teachers also are increasingly called upon to consult with and support regular educators in their instruction of special needs students, particularly those with mild and moderate disabilities (Sugai & Tindal, 1993). Arick & Klug (1993) found in a survey of 1,468 special education administrators, that the highest-rated training need of special educators was in training them so that they could work effectively with other instructional personnel. The expert special educator, then, may be seen as one that is skillful in facilitating this type of collaboration with his or her regular education colleagues.

Special educators also are instructing an increasingly diverse population of students. As a group, minorities often comprise the majority of students in public schools, while in the special education system, minority students continue to be over represented (Artiles & Trent, 1994). Unfortunately, we know little about how educators develop their cognitions, beliefs, and skills to teach diverse students (Grant & Secada, 1990). Grant and Secada suggest that examining the knowledge and skills of effective teachers may serve as a starting point for training novice teachers.

The changing role of the special educator begs for a close examination of those teachers who are particularly effectual in both both educating students with special

needs and in consulting with regular educators who instruct students with disabilities. Researchers have used the construct of expertise to conceptualize the knowledge that superior teachers in regular education possess (e.g., Berliner, 1986; Borko & Livingston, 1989; Carter, Cushing, Sabers, Stein, & Berliner, 1988; Comeaux & Peterson, 1987; Shulman, 1986). Expertise is generally defined as superior knowledge and skill within a specific domain (e.g., Chase & Simon, 1973; Chi, Feltovich & Glaser, 1981; Ericsson & Smith, 1991; Glaser & Chi, 1988). Experts have been found to perceive meaningful patterns in their area of expertise, to be faster than novices at performing a task, and to have superior short-term and long-term memory about events (Glaser & Chi, 1988).

In research on expert teachers, some researchers (e.g., Leinhardt, 1983; Leinhardt & Smith, 1985; Shulman, 1986) have investigated teacher instruction within a specific subject matters, while other studies have focused on teacher's pedagogical content knowledge (e.g., Shulman, 1986). Research on expert teachers in the regular classroom setting focus on how they organize their knowledge about the classroom and on the instructional decisions that they make. Several studies have suggested that expert teachers not only have more knowledge than novices; they differ in how their knowledge is organized (Borko & Livingston, 1989; Sabers, Cushing, and Greeno, 1986), they make different judgments about students (Leinhardt, 1983; Cadwell & Jenkins, 1986; Stader, Colyar, & Berliner, 1990) and pay attention to different information about students when planning and implementing their lessons (Carter & Doyle, 1987; Strahan, 1989). Unfortunately, there have been few investigations of expert special education teachers. Therefore, the purpose of this study was to examine the reflections of identified "expert" special educators who were working in a variety of instructional settings with diverse student populations.

Method

Participants

Participants were 20 special education teachers from urban, mid-size, and rural school districts. Special education supervisors in each of these districts were asked to nominate teachers who 1) had at least five years of teaching experience, 2) were recognized among their peers, parents, or the community as being effective teachers, 3) instructed students that generally made excellent progress in achieving their individualized education plan (IEP) objectives, and 4) were generally viewed by their supervisors as superior special education teachers. Principals of the nominated teachers were asked to confirm or disagree with these nominations. Teachers who were both nominated and who received confirmation for their selection were then contacted for participation. Similar criteria and methods have been used by other researchers in the area of teacher expertise (see Berliner, 1986; 1987; Bartelheim & Evans, 1993; Blanton, Blanton, & Cross, 1993) in order to select teachers who were "expert" and thus were used in this study to increase the probability that these teachers were part of a special sample.

Identified teachers were selectively sampled to represent a diverse array of instructional settings (i.e.. resource, inclusive, content mastery, and self-contained), instructional levels (i.e.. preschool, elementary, middle school, and high school) and student characteristics (learning disabilities, emotional disturbance, and mental

retardation) (see Table 1). The sample was also selected so that diverse ethnic minority groups were represented in both the teachers and the students who were invited to participate (see Table 2). The principal, special education coordinator, and the special educator themselves were each asked to describe the content domains and the curricular activities in which they felt the teacher was "particularly effective." These were the areas of instruction or responsibility that eventually became the focus of our investigation.

Procedure

Data was collected from the participants by five different researchers, each of whom was trained in interview and stimulated recall procedures. These researchers used a variety of methods to obtain information from each of the teacher participants. Each researcher was trained to follow the same procedures in collecting the following data:

Table 1

Teacher Participant Data

Teacher Name	Ethnicity	Years of Experience	Instructional Setting	Grade(s) Taught	Type of District
Beth	W	14	Inclusion	5	Rural
Ruby	H	16	Self-Contained	4	Urban
Sharon	W	5	Mastery	3, 4, 5	Mid-sized
Katy	W	13	Resource	3, 4, 5	Urban
Jamesha	AA	8	Resource	6, 7, 8	Mid-sized
Susan	W	19	Mastery	3, 4, 5	Urban
Liz	W	17	Mastery	6, 7, 8	Urban
Bonnie	W	15	Resource	1, 2, 3	Urban
Gina	W	8	Inclusion	10	Mid-sized
Donna	H	8	Inclusion	Pre-K, K	Urban
Nora	H	17	Inclusion	Pre-K, K	Urban
Kimberly	W	23	Mastery	7	Mid-sized
Lisa	W	5	Inclusion	6, 7, 8	Urban
Diana	W	21	Resource	4, 5, 6	Mid-sized
Connie	AA	22	Inclusion	5	Urban
Ellen	W	15	Inclusion	Pre-K	Mid-sized
Lorena	H	20	Self-Contained	9, 10, 11, 12	Urban
Nina	W	14	Inclusion	Pre-K	Mid-sized
Joanna	W	18	Resource	5	Rural
Hillary	W	16	Inclusion	9, 10, 11, 12	Urban

Table 2

Student Participant Data

Teacher Name	Students-Gender M	F	Students-Ethnicity AA	H	A	Total # of Students	Total # of Stu in Special I
Beth	10	12	4	6	12	22	8
Ruby	7	0	2	3	2	7	7
Sharon	12	1	1	7	5	13	13
Katy	6	0	3	1	2	6	6
Jamesha	11	2	7	5	1	13	13
Susan	7	6	2	0	11	13	9
Liz	10	5	3	8	4	15	7
Bonnie	6	6	0	1	11	12	10
Gina	20	4	5	7	12	24	9
Donna*	19	14	0	33	0	33	8
Nora*							
Kimberly	8	6	5	2	7	14	14
Lisa	12	9	2	7	12	21	11
Diana	4	2	1	1	4	6	6
Connie	10	11	14	7	0	21	4
Ellen	20	7	10	4	3	17	1
Lorena	3	3	3	2	1	6	6
Nina	9	11	12	3	5	20	7
Joanna	8	6	5	4	5	14	14
Hillary	15	10	2	7	16	25	4
Totals	**187**	**115**	**81**	**108**	**113**	**302**	**157**

*Donna and Nora co-teach the same students in the same classroom, therefore, these students were only counted once.

Interviews. Each teacher was interviewed and asked a standard series of questions about their classroom experiences and teaching philosophy (see Appendix A). The procedures to be used in the study were explained in detail and teachers were encouraged to share any discomforts or to suggest any areas of particular expertise they felt they had with the researcher. These interviews lasted approximately forty-five minutes, resulting in a total of ten hours of audiotaped interviews.

Videotaping. Six one-hour videotapes were made of each classroom teacher. The first videotaped session was used to explain the researcher's presence in the classroom to the students, to orient the researcher to the classroom, and to acclimate the class to the presence of the videotape recorder. Teachers were asked to select an instructional sequence and content area in which they felt that they were particularly skilled in delivering instruction. They were also asked to identify upcoming consultation sessions that they would have with regular educators or with other personnel providing transition services. Videotapes of these sessions were made during the natural course of the semester and scheduled by the special education teacher. In general, these videotapes were made over a period of two months. Approximately six hours of videotape was used per teacher for a total of 120 hours of videotape.

Observations. Observations were made in conjunction with each videotaping session. Notes were made concerning the number of students in the classroom, number of students who were classified as special education students, ratio of male to female students, ethnicity of the students, content area taught, grade level, and if adults other than the teacher were present in the classroom. A map was made of the classroom and the seating location of all students was noted. For each student enrolled in special education, their classification of disability was noted and the amount of time that they had been with the teacher observed. Observational notes were made both while videotaping the classroom and refined while the researcher reviewed the videotape at a later date.

Stimulated Recall. After each observation, an interview took place with the teacher as soon as possible following each observation and videotaping. A stimulated recall procedure (see Ericsson & Simon, 1984) was used to obtain teacher's reflections about the classroom interactions or consultations. This procedure replicated that used by other researchers in the field of teacher cognition (e.g., Peterson & Cormeux, 1987) in that teachers were asked to recall, to the extent possible, their thoughts and emotions during the classroom or consultative sequence.

During the stimulated recall procedure, the teacher viewed the videotape along with the investigator. The teacher was instructed to stop the videotape at points when s/he recalled thoughts or feelings that occurred during instruction or consultation. If a period of two minutes passed without comment by the teacher, the experimenter stopped the videotape and asked open-ended questions such as, "What were you trying to accomplish here?" or "What were your thoughts or feelings at this point?" All comments by the investigator and the teacher were simultaneously recorded on audiotape. Approximately forty-five minutes of

audiotape was obtained per recall session for an approximate total of four and a half hours per teacher and ninety hours of audiotape across all teachers.

Field Notes. Immediately following each contact with a teacher, the researchers completed field notes in which they noted technical notes (problems in collecting the data, special considerations for during their next contact with the teacher), analytical notes (analytical and conceptual reflections) and their general observations (the mood, tone, of the session). These notes were meant to supplement observational notes made during observations during classroom instruction. Approximately six pages of field notes were made for each teacher.

Data Analysis

In this study, we were interested in exploring the content and nature of instructional thinking in expert special education teachers. We wished to understand and describe the highly interactive process by which these teachers made decisions in the classroom. Therefore, we chose qualitative methodology, specifically, Grounded Theory (see Glaser & Strauss, 1967; Strauss & Corbin, 1990) to collect and analyze our data. Grounded Theory focuses upon the data that is elicited from the participants in a study and produces an inductively derived conceptual model that is grounded in this data. This methodology allows for the comparison of new data to previous cases so that the addition of new teachers in our study allowed us to revise our emerging conceptual model of teacher cognition.

All interviews and stimulated recall recordings were transcribed, which produced a total of 2,686 pages of transcription. After each individual transcript was completed, the researcher who collected the data analyzed the transcript via line-by-line analysis (Strauss & Corbin, 1990) using open coding. In open coding, transcripts are coded using labels that describe verbal statements at a higher level of abstraction. After the first transcript was coded by each researcher, they met with the first author to discuss the emerging codes and to establish some commonalities in labeling. Following the analytical procedures discussed by Glaser and Strauss (1967) and Strauss and Corbin (1990), we individually and then collectively examined the reponses of the twenty teachers in this study. Thereafter, the researchers discussed the codes that they were using on a weekly basis and met more formally on a monthly basis to review each other's codes and to discuss emerging themes from the data.

After each videotaped session, the researchers completed observational notes and classroom maps. Observational transcripts were made to record the activities that took place in each classroom and to note events that we believed would elicit instructional cognition from the teachers, such as prolonged exchanges with students or transitions from one instructional activity to another. The observational notes were analyzed were used a whole by examining the types of activities and the action and interaction patterns within the classroom. Classroom maps included demographic data on the students in the classroom such as, their ethnicity, sex, diagnostic category, and the time that they had been in class with the participating special education teacher. Also noted was the type of instructional setting, the subject matter taught during the instructional sequence, and the presence of other adults in the classroom. We incorporated data obtained from the interviews, observations, stimulated recall procedures, and from field notes.

Initially, each teacher's interview transcripts and observational notes were analyzed separately. The conceptual labels were discussed among the researchers and then were grouped together to form tentative categories. These categories were then arranged following Strauss & Corbin's (1990) suggestions for axial coding. This secondary analysis thus produced a conceptual model of cognition and instructional decision-making in special education teachers.

Memberchecks. A second interview was used at the end of the stimulated recall sessions and after open coding to verify the results of the preliminary analysis of the stimulated recall sessions conducted with each teacher. These interviews lasted approximately 30 minutes, however, as the analysis of each teachers' transcripts was individualized, the nature and length of these second interviews varied. Overwhelmingly, the majority of teachers agreed with the major categories of concern that the researchers noted following open coding and the initial interpretations made by the researchers.

Quantification of the data. In order to compare our data with that of other researchers who have investigated teacher cognition in regular education teachers we collapsed our categories into those that roughly paralleled those used by Peterson & Cormeux (1987). We used these categories to reexamine the open codes that were used during the qualitative analysis and tallied the number of codes that were mentioned by each teacher in each category. These tallies were summed, averaged, and converted to a percentage of the total number of comments made by each teacher (see Table 3). Comments were also calculated so that the mean percentage of total comments made could be calculated and compared.

Results

Eight superordinate categories emerged from the qualitative analysis of the data. Each of these categories consisted of subcategories listed in Table 3 that were grouped and organized conceptually. Theoretical descriptions of these categories follow (quotations have been limited in order to shorten the length of this paper):

Student Characteristics

The category that expert teachers in this study reflected upon the most was that of student characteristics. The category of student characteristics included how teachers reflected upon the overall ability characteristics of their students such as; motivation, intelligence level, memory, diagnostic category, and achievement level. Teachers talked about these student characteristics as a "jumping off place" from which they evaluatively commented about their students. Typical of these types of reflections were comments such as, "John is a typical learning disabled student, most of the time he is distracted in class and not very organized." Included in this category were reflections on how students typically performed in their regular education classroom and their overall pattern of learning difficulties.

Teachers discussed the student's home life or experiences as they pertained to the student's ability. Emotional characteristics of the student were often referred to, such as a student's typical mood state or self-esteem and self-confidence. Overall motivation tended to be discussed as a static characteristic in that the students were seen as having a typical level or interest (or disinterest) in school. Teachers

Table 3- Teachers' Thoughts (frequency and percentage) by Content Category

Category	All Teachers		Teacher #01 Rural Elementary Co-teaching		Teacher #02 Urban Elementary Self-contained		Teacher #03 Sm. Metropolitan Elementary Res Rm/ Content Mastery/Incl		Teacher #04 Urban Elementary Resource Room	
Group 1										
Student Characteristics/Behavior	**9736**	**(40%)**	350	(31%)	775	(45%)	554	(40%)	487	(39%)
Instructional Strategies	**4265**	**(18%)**	200	(18%)	265	(15%)	300	(22%)	224	(18%)
Teacher Characteristics/Behavior	**1822**	**(8%)**	31	(3%)	116	(7%)	95	(7%)	130	(10%)
Behavior Strategies	**1507**	**(6%)**	88	(8%)	186	(11%)	54	(4%)	93	(7.5%)
Classroom Environment	**1638**	**(7%)**	151	(13%)	62	(4%)	43	(3%)	35	(3%)
Group 2										
Monitoring Academic	**958**	**(4%)**	96	(8%)	59	(3%)	30	(2%)	13	(1%)
Instructional Materials	**676**	**(3%)**	31	(3%)	45	(2%)	39	(3%)	31	(2.5%)
Teacher Awareness	**358**	**(1%)**	7	(1%)	18	(1%)	79	(6%)	21	(2%)
Instructional Content	**539**	**(2%)**	28	(2%)	42	(2%)	44	(3%)	55	(4%)
Time	**547**	**(2%)**	60	(5%)	30	(2%)	42	(3%)	21	(2%)
Teacher Academic Expectations	**489**	**(2%)**	2	(<1%)	39	(2%)	48	(3%)	8	(<1%)
Instructional Goals	**266**	**(1%)**	9	(<1%)	23	(1%)	16	(1%)	44	(3.5%)
Parents/Home Factors	**234**	**(<1%)**			10	(<1%)	2	(<1%)	26	(2%)
Group 3										
Planning	**203**	**(<1%)**	34	(3%)	29	(2%)	17	(1%)	13	(1%)
Monitoring Behavior	**262**	**(1%)**	35	(3%)	13	(<1%)	5	(<1%)	6	(<1%)
Teacher Behavior Expectations	**212**	**(<1%)**	2	(<1%)			12	(<1%)	5	(<1%)
Administrative Issues	**91**	**(<1%)**	1	(<1%)	1	(<1%)	2	(<1%)	4	(<1%)
Curriculum	**76**	**(<1%)**	2	(<1%)	6	(<1%)	4	(<1%)	22	(2%)
Transitions	**37**	**(<1%)**	11	(1%)	9	(<1%)				
Context	**8**	**(<1%)**			5	(<1%)				
Total Reflections	**24135**		1138		1733		1386		1242	

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Table 3 (continued)- Teachers' Thoughts (frequency and percentage) by Content Category

Category	Teacher #05 Sm. Metropolitan Middle School Resource Room		Teacher #06 Urban Elementary Resource Room		Teacher #07 Sm. Metropolitan Middle School Content Mastery		Teacher #08 Rural Elementary Regular Ed.		Teacher # 09 Urban Elementary Resource Room	
Group 1										
Student Characteristics/Behavior	570	(44%)	286	(46%)	422	(37%)			256	(43%)
Instructional Strategies	239	(18%)	133	(21%)	207	(18%)			136	(23%)
Teacher Characteristics/Behavior	91	(7%)	38	(6%)	128	(11%)			40	(7%)
Behavior Strategies	68	(5.3%)	15	(2%)	6	(<1%)			38	(6%)
Classroom Environment	60	(5%)	31	(5%)	115	(10%)			28	(5%)
Group 2										
Monitoring Academic	34	(3%)	29	(5%)	108	(10%)			5	(1%)
Instructional Materials	13	(1%)	18	(3%)	29	(3%)			10	(2%)
Teacher Awareness	36	(3%)	4	(<1%)	7	(<1%)				
Instructional Content	11	(<1%)	29	(5%)	64	(6%)			22	(4%)
Time	27	(2%)	11	(2%)	17	(1%)			25	(4%)
Teacher Academic Expectations	51	(4%)	3	(<1%)	8	(<1%)			3	(<1%)
Instructional Goals	9	(<1%)	10	(2%)	9	(<1%)			5	(1%)
Parents/Home Factors	11	(<1%)	2	(<1%)	3	(<1%)			4	(<1%)
Group 3										
Planning	11	(<1%)	4	(<1%)	1	(<1%)			7	(1%)
Monitoring Behavior	14	(1%)	3	(<1%)	8	(<1%)			3	(<1%)
Teacher Behavior Expectations	25	(2%)							5	(1%)
Administrative Issues	16	(<1%)	3	(<1%)	4	(<1%)			5	(1%)
Curriculum	2	(<1%)	1	(<1%)					1	(<1%)
Transitions										
Context	1	(<1%)			1	(<1%)				
Total Reflections	1289		620		1137				593	

Table 3 (continued)- Teachers' Thoughts (frequency and percentage) by Content Category

Category	Teacher #10 Sm. Metropolitan High School Co-teaching		Teacher #11 Urban Preschool Co-teaching		Teacher #12 Urban Preschool Co-teaching		Teacher #13 Sm. Metropolitan Middle School Content Mastery		Teacher #14 Urban Middle School Resource Room	
Group 1										
Student Characteristics/Behavior	507	(38%)	539	(45%)	284	(45%)	552	(33%)	504	(42%)
Instructional Strategies	244	(18%)	138	(12%)	114	(18%)	281	(17%)	180	(15%)
Teacher Characteristics/Behavior	161	(12%)	48	(4%)	47	(7%)	192	(11%)	63	(5%)
Behavior Strategies	112	(8%)	136	(12%)	52	(8%)	67	(4%)	132	(11%)
Classroom Environment	107	(8%)	143	(12%)	34	(5%)	183	(11%)	139	(12%)
Group 2										
Monitoring Academic	30	(2%)	42	(4%)	30	(5%)	65	(4%)	41	(3%)
Instructional Materials	22	(2%)	30	(3%)	17	(3%)	74	(4%)	19	(2%)
Teacher Awareness	46	(3%)					47	(3%)		
Instructional Content			15	(1%)	23	(4%)	37	(2%)		
Time	12	(1%)	20	(2%)	6	(1%)	67	(4%)	42	(3%)
Teacher Academic Expectations	17	(1%)	12	(1%)	3	(<1%)	25	(1%)	14	(1%)
Instructional Goals	11	(1%)	7	(<1%)	3	(<1%)	10	(<1%)	4	(<1%)
Parents/Home Factors	1	(<1%)	11	(1%)	3	(<1%)	49	(3%)	13	(1%)
Group 3										
Planning	1	(<1%)	11	(1%)	5	(<1%)	3	(<1%)	7	(<1%)
Monitoring Behavior	24	(2%)	10	(<1%)	9	(1%)	8	(<1%)	12	(1%)
Teacher Behavior Expectations	14	(1%)	23	(2%)	3	(<1%)	10	(<1%)	21	(2%)
Administrative Issues	9	(<1%)			1	(<1%)	2	(<1%)	6	(<1%)
Curriculum	1	(<1%)							2	(<1%)
Transitions					1	(<1%)				
Context							1	(<1%)		
Total Reflections	1330		1185		636		1696		1199	

Table 3 (continued)- Teachers' Thoughts (frequency and percentage) by Content Category

Category	Teacher #15 Sm. Metropolitan Elementary Resource Room		Teacher # 16 Sm. Metropolitan Elementary Co-teaching		Teacher #17 Sm. Metropolitan Preschool Co-teaching		Teacher #18 Urban High School Self-Contained		Teacher #19 Sm. Metropolitan Preschool Co-teaching	
Group 1										
Student Characteristics/Behavior	591	(43%)	318	(46%)	853	(46%)	379	(47%)	531	(38%)
Instructional Strategies	262	(19%)	117	(17%)	312	(17%)	144	(18%)	319	(23%)
Teacher Characteristics/Behavior	48	(3%)	24	(3%)	207	(11%)	32	(4%)	186	(13%)
Behavior Strategies	53	(4%)	40	(6%)	85	(5%)	54	(7%)	75	(5%)
Classroom Environment	42	(3%)	58	(8%)	48	(3%)	74	(9%)	59	(4%)
Group 2										
Monitoring Academic	64	(5%)	39	(6%)	26	(1%)	26	(3%)	35	(2.5%)
Instructional Materials	87	(6%)	19	(3%)	60	(3%)	12	(1%)	49	(3%)
Teacher Awareness	24	(2%)			39	(2%)			16	(1%)
Instructional Content	34	(2%)	27	(4%)	17	(1%)	12	(1%)	6	(<1%)
Time	19	(1%)	16	(2%)	33	(2%)	7	(<1%)	18	(1%)
Teacher Academic Expectations	29	(2%)	12	(2%)	39	(2%)	9	(1%)	25	(2%)
Instructional Goals	14	(1%)	3	(<1%)	23	(1%)	6	(<1%)	23	(2%)
Parents/Home Factors	15	(1%)	3	(<1%)	33	(2%)	7	(<1%)	4	(<1%)
Group 3										
Planning	10	(<1%)	1	(<1%)	7	(<1%)	3	(<1%)	13	(1%)
Monitoring Behavior	8	(<1%)	4	(<1%)	28	(1.5%)	6	(<1%)	21	(1.5%)
Teacher Behavior Expectations	5	(<1%)	4	(<1%)	25	(1%)	14	(2%)	15	(1%)
Administrative Issues			3	(<1%)	2	(<1%)	6	(<1%)		
Curriculum	2	(<1%)			1	(<1%)	8	(1%)	3	(<1%)
Transitions	3	(<1%)	1	(<1%)	5	(<1%)			5	(<1%)
Context										
Total Reflections	1386		689		1844		799		1403	

Table 3 (continued)- Teachers' Thoughts (frequency and percentage) by Content Category

Category	Teacher # 20 Rural Elementary Resource/ CM		Teacher # 21 Urban Consulting T	
Group 1				
Student Characteristics/Behavior	675	(32%)	303	(42%)
Instructional Strategies	392	(19%)	58	(8%)
Teacher Characteristics/Behavior	170	(8%)	75	(10%)
Behavior Strategies	65	(3%)	88	(12%)
Classroom Environment	120	(6%)	106	(15%)
Group 2				
Monitoring Academic	157	(7%)	29	(4%)
Instructional Materials	58	(3%)	13	(2%)
Teacher Awareness	10	(<1%)		
Instructional Content	65	(3%)	8	(1%)
Time	52	(2%)	22	(3%)
Teacher Academic Expectations	135	(6%)	7	(1%)
Instructional Goals	36	(2%)	1	(<1%)
Parents/Home Factors	36	(2%)	1	(<1%)
Group 3				
Planning	26	(1%)		
Monitoring Behavior	38	(2%)	7	(1%)
Teacher Behavior Expectations	26	(1%)	3	(<1%)
Administrative Issues	19	(1%)	7	(1%)
Curriculum	20	(1%)		
Transitions	2	(<1%)		
Context				
Total Reflections	2102		728	

generally reflected on these student characteristics when they considered a student's academic needs and progress in school. These comments became an overall assessment from which teacher interpreted a student's learning and state of mind in the instructional setting.

Instructional Strategies

Expert special educators thought often about the instructional strategies that were needed to help their students learn. This category is interesting in that each

teacher has wide repertoire of strategies. Some of the most commonly used strategies included; repetition of material, reinforcing students for correct performance, modeling, and scaffolding students' learning so that they learned the material with a minimum of error and instruction. Teachers typically used instructional strategies that were accessible through different sensory modalities; visual, auditory, kinesthetic, and tactile. At times, instructional strategies also seemed to function as a classroom management or as a behavioral strategy, such as grouping students for cooperative learning, using a familiar routine to present instruction, or changing the pace of instruction so that all students could participate.

An important instructional strategy that expert special education teachers used often was that of modification. Modifications discussed by teachers included; reteaching the material, using instructional materials, prompting/cueing, modeling, changing the task, and giving students more practice at the task. Teachers carefully observed the result of their modifications and assessed each student's progress after it's implementation. If the teacher believed that the modification applied was not sufficient in aiding student learning, she typically reevaluated the student's learning difficulty and then selected a new modification to apply.

Teacher Knowledge

The category of teacher knowledge illustrated the complex and rich knowledge base that teachers reflected upon. All of these factors influenced how the teacher made a decision about what was the most appropriate course of action to take in supporting student learning. Teachers also seemed to have quite a bit of background knowledge on their students' characteristics and reflected often upon what their students knew and what they did not know, in other words, their students prior knowledge. They also had knowledge of their students' learning characteristics: how and under what circumstances they typically learned best. In addition, teachers reflected upon student's behavior and how it affected the teacher's classroom instruction.

Other types of knowledge that teachers discussed were their knowledge of the content that was being taught, or, in the case of modifying instruction, the knowledge necessary in order to modify the content. Teachers commented upon their knowledge of the tasks that students worked on. Finally, expert teachers commented on their knowledge of what was taking place in the regular education classroom and considered how the instruction presented in the regular education classroom affected students' learning in the special education classroom.

Student Knowledge and Learning

Teachers in this study reflected upon student's prior knowledge and the particular knowledge that a student had in the learning situation at hand. Teachers were especially likely to engage in this type of reflection when a student is had difficulty in learning or was exhibiting a misconception. Typical of these types of reflections were comments such as, "Windy isn't reading words that begin with 'ph' correctly- she isn't using the 'f' sound. I need to make sure she reads some other words to see if she doesn't understand this concept." This category seemed to interact closely with the other superordinate categories.

Teachers almost always reflected on student knowledge when individual students were actively engaged in learning in the classroom. When teachers

reflected on student knowledge they seemed to form a hypothesis about their students' "state of mind" based upon the complex knowledge base that they had about the student, the student's prior knowledge, the task at hand, and the typical learning difficulties that most students have when they are learning a similar task. They often used subtle cues while monitoring to help them make this hypothesis and yet seemed to be quite accurate at determining what their students were thinking. While teachers occasionally reflected on the knowledge or learning of a class as a whole, they seem to more frequently comment on this category with respect to a particular student. These comments were part of how a teacher then made a decision about which strategies or supports the student needed from the teacher in order to master the information.

Classroom Management

When reflecting upon classroom management teachers focused on the structure of the classroom. Classroom management included the procedures and routines that the teacher established for her students. This management appeared to proactively prevent behavioral problems in the classroom. Included in this category were teacher reflections upon the school rules, the routine of the classroom, the seating arrangement, and the overall classroom environment. The classroom aide, regular education teachers, and administrators who filtered in and out of the special education classroom became part of what the teacher reflected upon and orchestrated. Time was an additional major factor for these teachers and seemed to affect the pacing of the curriculum and thus how content was delivered as part of the instructional routine.

Monitoring Behavior and Academics

Much of these special education teachers were concerned with monitoring. These teacher spent much time monitoring how their students were performing academically and behaviorally. They seemed to use information gathered while monitoring to appropriately modify their instruction and their behavior management to meet the needs of their students.

When teachers monitored their students' academic progress, they seemed to be concerned with their students' understanding of the content and with the quality of their student work. They used cues such as students' questions, performance, and task completion to assess student knowledge. Expert teachers also used more subtle cues, such as students' affect and facial expressions to assess student understanding. They monitored student academic knowledge especially closely when they suspected that there was a problem with student understanding. Teachers often carefully analyzed the task in which the student is engaged when they suspected that the difficulty level of the task is high.

When teacher monitored their students' behavior, they visually and aurally scanned the classroom to note behavioral concerns. They were concerned with how these behaviors might be interfering with the learning of the student or the learning of other students in the classroom. Behaviors that the teacher monitored included individual or group level of involvement and participation in a task. Behavioral monitoring also included monitoring student compliance with classroom procedures and routines. Teachers seemed to monitor students' attention particularly closely when inattentiveness was negatively affecting student learning.

They may also monitored more subtle cues that tell them that their students were about to engage in problematic behavior, such as the level of student involvement or participation.

Student Behavior and Behavior Strategies

While teachers in this study were usually extremely proactive in trying to prevent student behavior problems, they occasionally reacted to students that were not behaving appropriately. Teachers became primarily concerned with student behavior in the classroom when they believed that this behavior affected a) the teacher's ability to deliver instruction, or b) the ability of the students to learn. This teacher concern about student behavior was specific- it usually involved a particular student and a particular incident that was occurring in the classroom.

Teachers in this study reflected upon and used a wide variety of behavioral strategies. While teachers used such strategies as changing their tone of voice, using proximity control, or redirecting, their behavioral strategies were frequently positive in tone, such as encouraging a student, using praise, or trying to motivate a student. Teachers often used classroom management techniques such as rearranging seating or implementing a token system when more than one student was exhibiting problems. Behavioral strategies were occasionally more overt, such as directly modeling the desired student behavior or talking directly to a student about his or her behavior. At times, teachers seemed to prefer to monitor the problem behavior and to ignore low rates of student behavior. Throughout the stimulated recall procedures, it appeared that teachers carefully considered their knowledge about the specific student and the particular incident before they intervened.

Instructional Diagnosis

Teachers in this study often engaged in a pattern of thought during instruction that we labeled "instructional diagnosis." When students expressed difficulty in the classroom, teachers typically "diagnosed" the student's ability to successfully engage in the task at hand. The teacher's diagnosis appeared to be based on the teacher's general knowledge of the student's learning characteristics, the specific demands of the task, and upon the student's behavioral characteristics. Teacher closely monitored the progress of the student on the task and considered their knowledge about the student's ability to learn in the immediate situation. The goal of this teacher diagnosis seems to be to evaluate the student's learning state or "state of mind." This diagnosis, along with the learning goals that the teacher has set for the student, subsequently seem to lead the teacher to develop a behavioral or instructional strategy for assisting the student.

Discussion

The teachers who participated in the stimulated recall procedure quickly became familiar and comfortable with the technique. Teachers seldom relied on prompts from the researcher and readily and prolifically expressed their thoughts and emotions concerning targeted teaching sequences. Many times these teachers did not restrict their comments to the episodes that they observed on the videotape, but expanded on how they made instructional decisions, describing previous events had influenced their decision-making.

We observed that many teachers made frequent use of what we have labeled "instructional diagnosis." The use of diagnosis is not unlike that described by Patel (1985) in her description of radiologists determining pathology when examining radiographs:

our teachers used extensive content knowledge and their particular knowledge of the student to arrive at a diagnosis. Immediately following their diagnosis, they applied a modification to remedy the learning difficulty that the student was encountering. This diagnostic process differs, however, from that of doctors in that this procedure was repeated numerous times over the course of the instructional period, with a diagnosis of one student often being made several times in the space of five or ten minutes.

Of interest to us was that this "instructional diagnosis" did not seem to rely on the category assigned to a student. Instead, teachers closely observed the progress of the student, basing their observation on the student's progress, together with their past knowledge of the student. Also of interest to us were the inferences that teachers in our project seemed to make about a given student's "state of mind" in this diagnostic process. These statements were based on information from multiple sources; observations of the student, past experiences in working with the student, and the teacher's experience in working on similar tasks with other students.

Implications

There is extant research on the training of novice teachers using the knowledge and information from expert teachers (see Berliner, 1986; 1987). This research suggests that novice teachers may be instructed to use similar routines and strategies as do expert teachers. However, it is often the case that an expert educator (such as a supervising teacher) has difficulty in clearly communicating the reasons for his or her instructional decisions. It is suggested by researchers in the field of expertise that this difficulty is due to the automatization of the behaviors that an expert possess: They are less accessible at a conscious level. The implications are that our present system of student teaching is limited in its effectiveness, no matter how expert the supervising teacher, simply because it is difficult for the supervising teacher to explain why he or she makes certain instructional decisions in the classroom.

An alternative method for transferring expertise, while still providing a real-world example, is with the use of case studies. In a Bay and Bryan (1991) study, it was found that novice teachers, after viewing videotapes of teachers instructing children with disabilities, increased their reflectivity after hearing audiotapes from stimulated recall procedures. These audiotapes included comments from teachers while they watched themselves in a videotape of an earlier teaching session. However, the effects of using such a format as part of a teacher training program has not been assessed.

We have used our data on these expert teachers to attempt to transfer expertise to student teachers via a seminar for student teachers. We believe that the study of expertise is valuable, but more important is the issue of transferring expertise to novice teachers. We have found in previous studies (Stough & Palmer, 1996) that stimulated recall and collegial reflection increases self-reflection, while it circumvents the problem of automaticity in expert educators. Second, when teachers in the field have opportunity to reflect on their teaching, such as in the stimulated recall procedure we have conducting, they find the procedure useful in analyzing their teaching. Finally, we believe that this technique can facilitate the transfer of expertise by providing student teachers with models of expert special educators in real-world contexts.

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Appendix A

Interview #1 Questions

1. How long have you been teaching?
2. Tell me about previous settings in which you have taught.
3. Describe the classroom in which you are presently teaching.
4. Tell me about the student that you are currently teaching.
5. How would you describe your teaching style?
6. What would you say is your teaching philosophy?
7. What do you consider to be your teaching strengths?
8. What do you consider to be your teaching weaknesses?
9. Can you think of a particular teaching experience that has changed your perspective on teaching special education?
10. What do you feel is the most rewarding aspect of your job?
11. What do you feel is the most frustrating aspect of your job?
12. When you consider your own teacher training program, what was the most helpful part of that program to your development as a teacher? The least useful? What changes would you suggest in designing teacher training programs?
13. What do you think makes a special education teacher an expert?